

## CLAIMS

What is claimed is:

1. A method for implementing smart DSL for LDSL systems, the method comprising:  
presenting a number of spectral masks that are available on the LDSL system;  
and  
selecting from the number of spectral masks an upstream mask and a downstream mask wherein the upstream mask and the downstream mask exhibit complimentary features.
2. The method of claim 1 wherein selecting the upstream mask and the downstream mask is performed during a modem start up period.
3. The method of claim 1 wherein selecting the upstream mask and the downstream mask is performed manually.
4. The method of claim 1 wherein selecting the upstream mask and the downstream mask is performed automatically.
5. The method of claim 1 wherein the number of spectral masks further comprises a number of upstream masks ( $U_1, U_2, U_3, \dots, U_n$ ) and a number of downstream masks ( $D_1, D_2, D_3, \dots, D_n$ ).
6. The method of claim 5 wherein one of the number of upstream masks is defined by the following relations, wherein  $f$  is a frequency band in kHz and  $U_1$  is the value of the mask in dBm/Hz:  
for  $0 < f \leq 4$ , then  $U_1 = -97.5$ , with max power in the in 0-4 kHz band of +15 dBm;

for  $4 < f \leq 25.875$ , then  $U1 = -92.5 + 23.43 \times \log_2(f/4)$ ;  
 for  $25.875 < f \leq 60.375$ , then  $U1 = -29.0$ ;  
 for  $60.375 < f \leq 90.5$ , then  $U1 = -34.5 - 95 \times \log_2(f/60.375)$ ;  
 for  $90.5 < f \leq 1221$ , then  $U1 = -90$ ;  
 for  $1221 < f \leq 1630$ , then  $U1 = -99.5$  peak, with max power in the  $[f, f + 1 \text{ MHz}]$  window of  $(-90 - 48 \times \log_2(f/1221) + 60)$  dBm; and  
 for  $1630 < f \leq 11040$ , then  $U1 = -99.5$  peak, with max power in the  $[f, f + 1 \text{ MHz}]$  window of  $-50$  dBm.

7. The method of claim 5 wherein one of the number of downstream masks is defined by the following relations, wherein  $f$  is a frequency band in kHz and  $D1$  is the value of the mask in dBm/Hz:

for  $0 < f \leq 4$ , then  $D1 = -97.5$ , with max power in the in 0-4 kHz band of  $+15$  dBm;

for  $4 < f \leq 25.875$ , then  $D1 = -92.5 + 20.79 \times \log_2(f/4)$ ;

for  $25.875 < f \leq 81$ , then  $D1 = -36.5$ ;

for  $81 < f \leq 92.1$ , then  $D1 = -36.5 - 70 \times \log_2(f/81)$ ;

for  $92.1 < f \leq 121.4$ , then  $D1 = -49.5$ ;

for  $121.4 < f \leq 138$ , then  $D1 = -49.5 + 70 \times \log_2(f/121.4)$ ;

for  $138 < f \leq 353.625$ , then  $D1 = -36.5 + 0.0139 \times (f - 138)$ ;

for  $353.625 < f \leq 569.25$ , then  $D1 = -33.5$ ;

for  $569.25 < f \leq 1622.5$ , then  $D1 = -33.5 - 36 \times \log_2(f/569.25)$ ;

for  $1622.5 < f \leq 3093$ , then  $D1 = -90$ ;

for  $3093 < f \leq 4545$ , then  $D1 = -90$  peak, with maximum power in the  $[f, f + 1 \text{ MHz}]$  window of  $(-36.5 - 36 \times \log_2(f/1104) + 60)$  dBm; and

for  $4545 < f \leq 11040$ , then  $D1 = -90$  peak, with maximum power in the  $[f, f + 1 \text{ MHz}]$  window of  $-50$  dBm.

8. The method of claim 5 wherein one of the number of upstream masks is defined by the following relations, wherein  $f$  is a frequency band in kHz and  $U2$  is the value of the mask in dBm/Hz:
- for  $0 < f \leq 4$ , then  $U2 = -97.5$ , with max power in the in 0-4 kHz band of +15 dBm;
- for  $4 < f \leq 25.875$ , then  $U2 = -92.5 - 22.5 \times \log_2(f/4)$ ;
- for  $25.875 < f \leq 86.25$ , then  $U2 = -30.9$ ;
- for  $86.25 < f \leq 138.6$ , then  $U2 = -34.5 - 95 \times \log_2(f/86.25)$ ;
- for  $138.6 < f \leq 1221$ , then  $U2 = -99.5$ ;
- for  $1221 < f \leq 1630$ , then  $U2 = -99.5$  peak, with max power in the  $[f, f + 1 \text{ MHz}]$  window of  $(-90 - 48 \times \log_2(f/1221) + 60)$  dBm; and
- for  $1630 < f \leq 11040$ , then  $U2 = -99.5$  peak, with max power in the  $[f, f + 1 \text{ MHz}]$  window of -50 dBm.
9. The method of claim 5 wherein one of the number of downstream masks is defined by the following peak values, wherein  $f$  is a frequency in kHz and  $D2$  is the peak value of the mask in dBm/Hz:
- for  $f = 0.0$ , then  $D2 = -98.0$ ;
- for  $f = 3.99$ , then  $D2 = -98.00$ ;
- for  $f = 4.0$ , then  $D2 = -92.5$ ;
- for  $f = 80.0$ , then  $D2 = -72.5$ ;
- for  $f = 120.74$ , then  $D2 = -47.50$ ;
- for  $f = 120.75$ , then  $D2 = -37.80$ ;
- for  $f = 138.0$ , then  $D2 = -36.8$ ;
- for  $f = 276.0$ , then  $D2 = -33.5$ ;
- for  $f = 677.0625$ , then  $D2 = -33.5$ ;
- for  $f = 956.0$ , then  $D2 = -62.0$ ;
- for  $f = 1800.0$ , then  $D2 = -62.0$ ;
- for  $f = 2290.0$ , then  $D2 = -90.0$ ;

for  $f = 3093.0$ , then  $D2 = -90.0$ ;  
for  $f = 4545.0$ , then  $D2 = -110.0$ ; and  
for  $f = 12000.0$ , then  $D2 = -110.0$ .

10. The method of claim 5 wherein one of the number of upstream masks is defined by the following peak values, wherein  $f$  is a frequency in kHz and  $U3$  is the peak value of the mask in dBm/Hz:

for  $f = 0$ , then  $U3 = -101.5$ ;  
for  $f = 4$ , then  $U3 = -101.5$ ;  
for  $f = 4$ , then  $U3 = -96$ ;  
for  $f = 25.875$ , then  $U3 = -36.30$ ;  
for  $f = 103.5$ , then  $U3 = -36.30$ ;  
for  $f = 164.1$ , then  $U3 = -99.5$ ;  
for  $f = 1221$ , then  $U3 = -99.5$ ;  
for  $f = 1630$ , then  $U3 = -113.5$ ; and  
for  $f = 12000$ , then  $U3 = -113.5$ .

11. The method of claim 5 wherein one of the number of downstream masks is defined by the following peak values, wherein  $f$  is a frequency in kHz and  $D3$  is the peak value of the mask in dBm/Hz:

for  $f = 0$ , then  $D3 = -101.5$ ;  
for  $f = 4$ , then  $D3 = -101.5$ ;  
for  $f = 4$ , then  $D3 = -96$ ;  
for  $f = 80$ , then  $D3 = -76$ ;  
for  $f = 138$ , then  $D3 = -47.5$ ;  
for  $f = 138$ , then  $D3 = -40$ ;  
for  $f = 276$ , then  $D3 = -37$ ;  
for  $f = 552$ , then  $D3 = -37$ ;  
for  $f = 956$ , then  $D3 = -65.5$ ;

for  $f = 1800$ , then  $D3 = -65.5$ ;

for  $f = 2290$ , then  $D3 = -93.5$ ;

for  $f = 3093$ , then  $D3 = -93.5$ ;

for  $f = 4545$ , then  $D3 = -113.5$ ; and

for  $f = 12000$ , then  $D3 = -113.5$ .